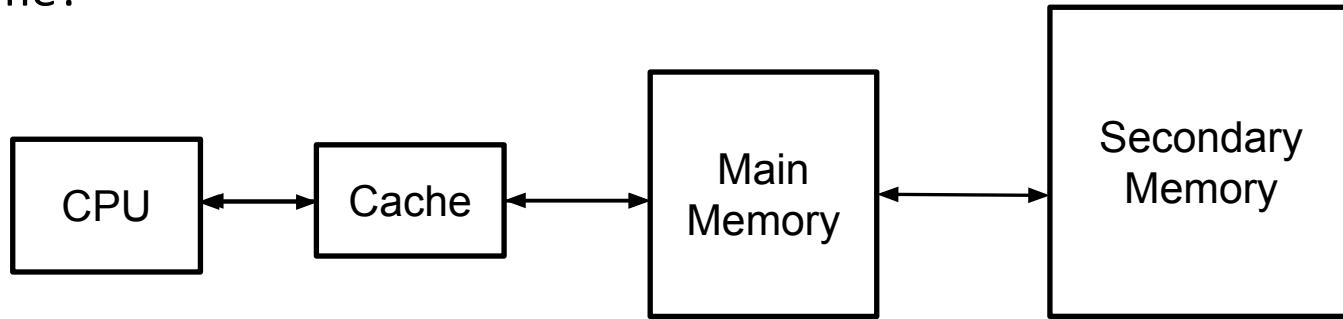


Example: A three level memory system having cache access time of 15 ns ,main memory access time of 25 ns and disk access time of 40 ns has a cache hit ratio of 0.96 and main memory hit ratio of 0.9. What should be the Average Memory Access Time?



Cache access time = $t_c = 15$ ns

Main memory access time = $t_m = 25$ ns

Disk access time = $t_d = 40$ ns

Hit ratio of cache = $h_c = 0.96$

Hit ratio of main memory = $h_m = 0.9$

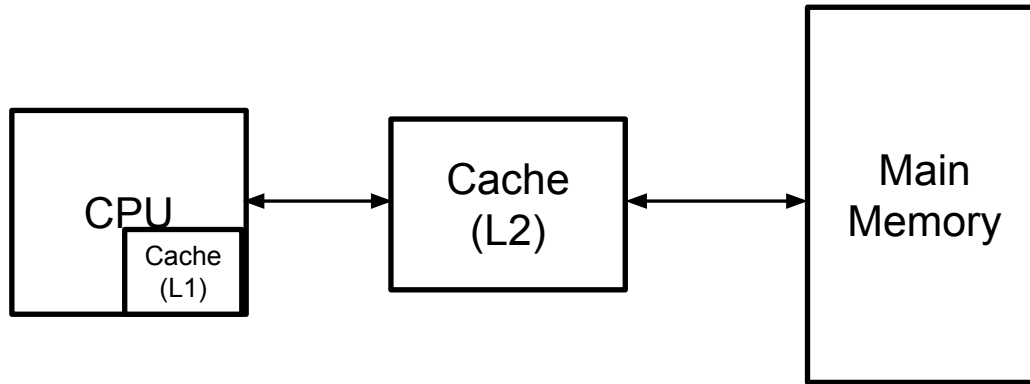
Average Memory Access Time = $h_c \times t_c + (1 - h_c) \times h_m \times (t_m + t_c) + (1 - h_c) \times (1 - h_m) \times (t_d + t_m + t_c)$

$$= 0.96 \times 15 + 0.04 \times 0.9 \times (25 + 15) + 0.04 \times 0.1 \times (40 + 25 + 15) \text{ ns}$$

$$= 16.16 \text{ ns}$$

Example: A three level memory system having cache access time of 15 ns and disk access time of 80 ns has a cache hit ratio of 0.96 and main memory hit ratio of 0.9. What should be the main memory access time if Average Memory Access Time is 16.4?

On chip cache and off chip cache



- The first level cache (L1 cache) is smaller in size compare to second level cache (L2 cache).
- L1 cache is on-chip cache, whose access time is near to the clock speed of the CPU.
- L2 cache is off-chip cache, larger enough to capture many accesses that would go to main memory.

Thank You